

Application Serial No.: 09/560,469

Docket No.: UNF-9058 A

Applicants: Joseph A. Fernando, et al.

Response to Office Action Dated: January 17, 2007

Response Filed: July 17, 2007

**III. REMARKS**

United States Serial No. 09/560,469 was filed on April 28, 2000 with claims 1-40. Claims 41-46 were added by Preliminary Amendment filed on June 5, 2002. In response to the Restriction Requirement mailed on April 14, 2003, Applicants elected claims 1-27 and 41-44 for prosecution in the present application. Applicants added claims 47-57 and cancelled claims 3, 4, 15, 28-40, 45 and 46 by their Response mailed April 27, 2006. Applicants hereby request reconsideration of the application and the issuance of a formal notice of allowance of claims 1, 2, 5-13, 16-27, 41-44, and 47-57.

**35 U.S.C. §103 Rejection**

Claims 1, 2, 5-13, 16-27, 41-44, and 47-57 are rejected under 35 U.S.C. §103 over United State Patent No. 5,580,532 (“US ‘532”), in view of JP 07-286,514 (“JP ‘514”) and GB 1,481,133 (“GB ‘133”).

The Office Action specifically alleges that it would have been obvious to one having ordinary skill in the art at the time the invention was made to heat the ceramic fibers in the catalytic converter of Robinson et al to obtain a crystalline structure with the specific percentage of crystallinity as allegedly taught by Sasaki et al and the specific crystallite size as allegedly taught by Johnson et al. Applicants submit that none of the claims are properly rejected under 35 U.S.C. §103 and therefore the rejection is respectfully traversed.

**US '532**

The Office Action identifies certain limitations of the claimed exhaust gas treatment device which are allegedly disclosed by US '532, but expressly and unequivocally concedes that US '532 *does not* disclose or suggest an exhaust gas treatment device mounting mat containing ceramic fibers having the percent crystallinity or crystallite size as claimed in the present application. Furthermore, US '532 does not provide any suggestion or motivation to treat the ceramic fibers to provide such crystallinity and crystallite size.

**JP '514**

JP '514 discloses a “holder” for exhaust gas purifying devices. The holder is comprised of alumina fibers. The composition of the alumina fibers of JP '514 is strictly limited to fiber compositions having a weight ratio of  $\text{Al}_2\text{O}_3:\text{SiO}_2$  of 70:30 – 74:26. See Abstract (Pages 1 and 2); Claim 1; and Page 4, Lines 3-7. In fact, JP '514 expressly teaches that when the  $\text{Al}_2\text{O}_3:\text{SiO}_2$  ratio is not in the range of 70:30 – 74:26, fiber deterioration occurs prematurely and the fibers do not withstand long usage. See Page 4, Lines 4-7.

**GB '133**

GB '133 discloses heat-treating ceramic fiber blankets. There is no disclosure or suggestion to utilize a blanket of heat-treated ceramic fibers as a support element for exhaust gas treatment devices. There is also not teaching or suggestion of the heat treating regimens claimed in the present application.

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To establish a *prima facie case* of obviousness under 35 U.S.C. §103(a) there must be (1) a suggestion or motivation to modify a reference, (2) a reasonable expectation of success, and (3) the modification of the reference must teach or suggest all claimed limitations. *In re Vaeck*, 947 F.2d 488 (Fed.Cir. 1991). Applicants respectfully submit that the reasons of record in the Office Action fail to establish all three elements of a *prima facie* case of obviousness under 35 U.S.C. §103(a). Because the Office Action fails to establish all elements of a *prima facie* case of obviousness under 35 U.S.C. §103(a), the rejection under 35 U.S.C. §103(a) should be withdrawn.

Evidence showing there is no reasonable expectation of success may support a conclusion of nonobviousness. *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976). The combination of US '532, JP '514, and GB '133 would not suggest to one of ordinary skill in the art a reasonable expectation of success. JP '514 teaches that "the fiber must be a mullite composition having a weight ratio of  $Al_2O_3/SiO_2$ ... of 70/30 ~ 74/26. When  $Al_2O_3/SiO_2$  of alumina fiber is not in the above-described range, fiber deterioration, caused by crystallization and crystal growth at high temperatures, occurs prematurely and it does not withstand long usage." See JP '514 at Page 4, Lines 3-7. This express teaching found in JP '514 is clear evidence that the inventors therein were confident that a holder comprised of fibers having a composition outside of the disclosed range of 70/30 to 74/26 would not perform sufficiently. Given the teachings of JP '514, one having ordinary skill in the art would not be motivated to manufacture a support element for a catalytic converter utilizing a fiber composition that is outside the range disclosed by Sasaki, as Sasaki expressly teaches that such fiber compositions would not be useful in such support element applications.

The Office Action also alleges that JP '514 discloses "non-preferred" embodiments, and these non-preferred embodiments disclosed by JP '514 still constitute prior art. Applicants assert that JP '514 does not disclose that fiber compositions outside of the 70/30 ~ 74/26 range are non-preferred. To the contrary, JP '514 is unequivocal in its teachings that the fiber composition must fall in the 70/30 ~ 74/26 range and that other

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ratios will not work. (“The fiber must be a mullite composition having a weight ratio of Al<sub>2</sub>O<sub>3</sub>/SiO of 70/30-74-26. When the Al<sub>2</sub>O<sub>3</sub>/SiO<sub>2</sub> of the alumina fiber is not in the above-described range, fiber deterioration, caused by crystallization and crystal growth at high temperature occurs prematurely and it does not withstand long usage” See Sasaki at Page 4, Paragraph [0005]. Sasaki does not disclose or suggest any other useful fiber compositions. Therefore, the presently claimed range of about 40 weight percent to about 60 weight percent alumina and about 60 weight percent to about 40 weight percent silica does not fall within some alleged non-preferred embodiment of Sasaki. Because the presently claimed exhaust gas treatment device includes a support element comprised of Al<sub>2</sub>O<sub>3</sub>/SiO<sub>2</sub> fibers that are outside of the range of 70/30 ~ 74/26 range disclosed by Sasaki, a person of ordinary skill in the art would expect deterioration and failure to withstand long usage, and would generally have no reasonable expectation of success.

US ‘532 does not disclose or suggest the limitations of an exhaust gas treatment device mounting mat comprising ceramic fibers having the claimed percent crystallinity or crystallite size. US 532 also does not disclose, suggest, or provide motivation to utilize melt-formed ceramic fibers to prepare a support element for an exhaust gas treatment device. US 532 discloses that suitable fibers for use in preparing a mounting mat include polycrystalline ceramic oxide fibers prepared in accordance with Miyahara et al. Miyahara et al disclose the formation of sol-gel fibers by fiberizing a solution of ceramic oxide precursor material. In contrast to the sol-gel processes that involve fiberizing solutions of ceramic oxide precursor materials, the fibers utilized in the support element of the presently claimed exhaust gas treatment device are prepared by melt-forming processes. Melt-forming involves the melting of solid ceramic oxide precursor material to form a melt of ingredients and forming fibers by a technique, such as blowing, drawing, or spinning. In contrast to the sol-gel processes, the melt-forming processes do not involve dissolving ceramic oxide precursor materials in a solution and then fiberizing the solution. Furthermore, Miyahara specifically discloses “[F]iber produced in accordance with the invention . . . is believed to comprise a fiber which is either non-crystalline or which contains small inter-connecting or inter-twined crystallites.” Thus,

Miyahara actually teaches away from heat treating ceramic oxide fibers to develop crystallinity.

In view of the teachings of JP '514, one having ordinary skill in the art would not be motivated to utilize aluminosilicate fibers having a weight ratio of  $\text{Al}_2\text{O}_3:\text{SiO}_2$  that is outside of the range of 70:30 – 74:26 in the formation of a support element for an exhaust gas treatment device. GB '133 does not disclose, suggest, or provide motivation to utilize ceramic fibers in a mounting mat for exhaust gas treatment devices, such as catalytic converters and diesel particulate traps. Because GB '133 does not disclose or suggest a mounting mat for catalytic converters, it logically follows that is no teaching or disclosure that the fibers of GB '133 exert any minimum holding pressures. GB '133 is limited to fluffy thermal insulation blankets for refractory furnace insulation. As described in the previously submitted Declaration of Joseph A. Fernando, the differences in thickness, density, shot content, the insulation blanket described in GB '133 simply would not provide the requisite holding pressure to maintain the fragile catalyst support structure in place within the housing of the exhaust gas treatment device during the rigorous operating conditions of the exhaust gas treatment device. Thus, the teaching to incorporate a mounting mat of ceramic fibers having certain percent crystallinity and crystallite size into an exhaust gas treatment device to provide requisite holding forces is derived only from the present application, and that the combination of GB '133 and US '532 is a result of improper hindsight analysis.

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Because the product of US '532 does not disclose the claimed features of percent crystallinity, crystalline size or melt-formed ceramic fibers, the product of the instant claim is not substantially the same as the product of US '532. Furthermore, the combination of US '532 with JP '514 and GB '133 does not arrive at the presently claimed invention, because this combination of references does not show all of the claimed limitations. GB '133 and JP '514 disclose heat treating regimen that are outside of those claimed in the present application. The combination of references does not show the use of melt-formed, which are different from sol-gel formed fibers. The combination of references also does not show heat treated ceramic fibers having the presently claimed ratios of alumina and silica. The combinatgion of references also does not show the claimed heat treating regimens.

In view of the above amendments and remarks, Applicants respectfully request withdrawal of the pending objections and rejections, and further request the issuance of a formal notice of allowance directed to the pending claims 1, 2, 5-13, 16-27, 41-44, and 47-57. Should the Examiner have any questions regarding the amendments and/or remarks presented in the present response, Applicants' undersigned attorney would welcome a telephone call.

Respectfully submitted,



Joseph G. Curatolo, Esq. (Reg. No. 28,837)

Salvatore A. Sidoti, Esq. (Reg. No. 43,921)

Curatolo Sidoti Co., LPA

24500 Center Ridge Road, Suite 280

Cleveland, OHIO 44145

Telephone: 440.808.0011

Facsimile: 440.808.0657

Customer No. 23575

Attorneys for Applicants

7-17-07

Date